

Appendix H

Documentation on Cost Estimate References

The following clarifies the information provided in Appendix H to the Focused Feasibility Study for the Lower Eight Miles of the Lower Passaic River, with reference information on some of unit prices used in the cost estimates.

Unit prices were taken from a variety of published and unpublished sources such as RS Means© (cost estimating software), internal cost databases, standard industrial multipliers, and communications with contractors, suppliers, vendors and other professional engaged in similar activities. Where appropriate, costs were based on the delivery of goods and services in Newark, New Jersey. The unit prices shown may be based on a compilation of related costs rather than one specific line item. For example, fencing costs could include items such as fencing material, gates (man and vehicular), concrete (for posts), manual and automatic controls, and installation. The compiled costs were converted to a single representative unit of measure for presentation purposes; in the fencing example above, the unit prices is presented as the cost per linear foot of fencing. Sources referenced in Appendix H are based on the following:

- Vendor or contractor communications – these unit prices/lump sum are based on verbal or written communications or published data from contractors, manufacturers, laboratories and other material or equipment suppliers.
- Recent project experience –these unit prices/lump sum are based on recent related experience on investigation and construction projects performed by Louis Berger and others.
- Standard multiplier – standard industry multipliers were used to estimate costs for mobilization/demobilization, mechanical/electrical costs, and other facility construction costs for which detailed information was not available at the conceptual design level.
- Cost estimating software – these unit prices/lump sum costs are based on unit prices taken from cost estimating software such RS Means.

2 CAPITAL COSTS

2.1 A. Pre-Construction Activities

Pre-Construction Support Facility:

- Monthly lease rate - \$10,000 [Recent project experience]

Pre-Design Investigation – Chemical, Waste Characterization and Geological Sample Collection

- Investigation derived waste (IDW) transportation and disposal cost of \$630 per cubic yard [Recent project experience]

Pre-Design Investigation – Geotechnical Sample Collection

- Undisturbed sample collection and processing cost - \$500 per sample [Recent project experience]
- IDW transportation and disposal cost of \$630 per cubic yard [Recent project experience]

Pre-Design Investigation – Chemical Analysis:

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Pre-Design Investigation – Waste Characterization Analysis:

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Pre-Design Investigation – Geological Analysis:

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Pre-Design Investigation – Geotechnical Analysis:

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Pore Water Evaluation:

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Borrow Site Pre-Screening:

- Cost per sample (including collection and shipping) - \$3,000 [Recent project experience]

Borrow Material Characterization

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Cap Erosion Modeling for Armor Placement Design:

- Computer modeling of final cap design [Recent project experience]

2.2 B. Mobilization and Demobilization

Shoreline Protection Equipment Mobilization/Demobilization:

- One time mobilization charge of \$237,000 for each Alternative [Contractor communications]

2.3 C. Testing and Monitoring During Dredging and Backfilling/Capping

Water Quality Monitoring

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Sediment Monitoring

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Biological Monitoring

- Average monthly cost of approximately \$112,500 or approximately \$1,350,000 per year [Recent project experience]

Monitoring Reports (including Laboratory Reporting)

- Annual cost of \$355,000 monitoring reports during dredging [Recent project experience]

2.4 D. Dredging

Utility Protection

- Cost of \$100 per square foot of sheeting for installation and removal following dredging operations [Cost estimating software, Recent project experience]

Bridge/Abutment/Bulkhead Protection:

- Cost of protection - \$4,100 per linear foot [Cost estimating software, Recent project experience]

Hydraulic Offloading of Dredged Material

- Hydraulic offloading cost - \$10 per cubic yard for DMM Scenarios B and C only [Recent project experience, Contractor communications]

2.5 E. Backfill and/or Engineered Cap

Sediment Recontamination Monitoring

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Mudflat Backfill/Engineered Cap

Alternative 2

- Cost to purchase, deliver and place backfill material - \$50 per cubic yard [Recent project experience, Vendor communications]

Alternative 3 and 4

- Cost to purchase, deliver and place backfill material - \$80 per cubic yard [Recent project experience, Vendor communications]

Mudflat Reconstruction

- Cost to purchase and deliver mudflat reconstruction material - \$100 per cubic yard [Recent project experience]
- Cost to place mudflat reconstruction material - \$50 per cubic yard [Recent project experience]

3 DREDGED MATERIALS MANAGEMENT CAPITAL COSTS

3.1 CAD (DMM Scenario A)

Upland Support Facility Site Investigation – Geotechnical:

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Upland Support Facility Site Investigation – Chemical

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Topographic Survey – Upland Support Facility Site

- Daily rate for survey crew - \$4,000 [Recent project experience]

Pre-Design Investigation of CAD Site – Chemical Sample Collection

- Assumes excess sediment (*i.e.*, IDW) is transported/disposed at cost of \$630 per cubic yard [Recent project experience]

Pre-Design Investigation of CAD Site – Geotechnical Sample Collection:

- Undisturbed sample collection and processing cost - \$500 per sample [Recent project experience]

Pre-Design Investigation of CAD Site – Chemical Analysis

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Pre-Design Investigation of CAD Site – Geotechnical Analysis

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Elutriate Evaluation

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Contaminated Sediment Testing and Disposal (First Cell):

- Analysis cost [Vendor communications]

Clay Dredging/Transport/Disposal at HARS

- Cost to dredge, transport and dispose of dredged material at HARS - \$25 per cubic yard [Recent project experience]

Testing and Monitoring

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]
- Lump sum data reporting cost of \$63,000 [Recent project experience]

Mobilization/Demobilization

- Ten percent of construction costs for uplands facility [Industry standard]

Layout and Documentation Survey

- Daily rate for survey crew - \$4,000 [Recent project experience]

Fencing

- Material purchase and installation - \$60 per lineal foot [Cost estimating software]

Exterior Lighting

- Material purchase and installation - \$50,000 per acre [Cost estimating software]

Security

- Lump sum cost of \$20,000 for each alternative [Recent project experience]

Buildings

- Cost - \$100 per square foot not including amenities [Cost estimating software, Recent project experience]
- Amenities (laboratory, shower, locker room), mechanical, electrical – Lump sum - \$125,000 [Cost estimating software, Recent project experience]
- Guard shack – Lump sum - \$15,000 [Recent project experience]
- Truck wash facility – Lump sum - \$20,000 [Recent project experience]

Utilities

- Electrical connection - \$50,000 [Recent project experience]

Earthwork

- Grading cost - \$12 per cubic yard [Recent project experience, cost estimating software]

Stormwater Management

- Stormwater system design intensity - 24-hour, 10-year storm event:
 - Grading costs - \$15 per cubic yard [Recent project experience, cost estimating software]

Paving

- Installed cost of filter fabric - \$2 per square yard [Cost estimating software]
- Installed cost of subgrade material - \$40 per cubic yard [Cost estimating software]
- Installed cost of plant mix asphalt paving - \$20 per square yard [Cost estimating software]

Pier/Dock Structure

- Material cost and installation - \$160 per square foot [Recent project experience]

Engineered Cap Material Placement

- Installation cost - \$30 per cubic yard [Contractor communications]

Confirmation Coring

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Bathymetric Survey

- Daily rate for survey crew - \$8,200 [Contractor communications, Recent project experience]

3.2 Off-Site Disposal (DMM Scenario B)

Upland Sediment Processing Facility Site Investigation – Geotechnical

- Cost for core sampling and processing - \$1,800 per core [Recent project experience]
- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Upland Sediment Processing Facility Site Investigation – Chemical:

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Topographic Survey – Upland Sediment Processing Facility Site:

- Daily rate for survey crew - \$4,000 [Recent project experience]

Mobilization and Demobilization

- Ten percent of DMM construction phase capital costs (not including DMM Pre-Construction Activities costs) [Standard multiplier]

Mechanical and Electrical:

- Ten percent of DMM construction phase capital costs (not including DMM Pre-Construction Activities costs) [Standard multiplier]

Layout and Documentation Survey:

- Daily rate for survey crew - \$4,000 [Contractor communications]

Fencing:

- Material purchase and installation - \$60 per linear foot [Cost estimating software]

Exterior Lighting:

- Material purchase and installation - \$50,000 per acre [Cost estimating software]

Security:

- Lump sum cost of \$100,000 [Recent project experience]

Buildings

- Cost - \$100 per square foot not including amenities [Cost estimating software, Recent project experience]
- Guard shack - 150 square feet @ \$100 per square foot [Recent project experience]
- Truck wash - Lump sum \$100,000 [Cost estimating software, Recent project experience]

Utilities

- Electrical connection - \$500,000 [Recent project experience, Vendor communications]

Paving:

- Installed cost of filter fabric - \$2 per square yard [Cost estimating software]
- Installed cost of subgrade material - \$40 per cubic yard [Cost estimating software]
- Installed cost of plant mix asphalt paving - \$20 per square yard [Cost estimating software]

Pier/Dock Structure

- Material cost and installation - \$160 per square foot [Recent project experience]

Storage Area – Concrete Slab and Push Walls:

- Installed costs for concrete slabs - \$600 per cubic yard [Cost estimating software, Recent project experience]

Storage Area – Subgrade Material:

- Installed cost for subgrade material under slab - \$40 per cubic yard [Recent project experience]

Storage Area – Filter Fabric:

- Installed cost for filter fabric under slab - \$2 per square yard [Cost estimating software, Recent project experience]

Storage Area – Vapor Emissions Control:

- Installed cost per unit - \$5,000 [Recent project experience]

Piping

- Installed/delivered cost - \$25 per linear foot for exterior piping and \$15 per linear foot for interior piping [Cost estimating software, Recent project experience]

Upfront Storage and Recycle Water Tanks:

- Storage capacity provided for each tank - 12 hours [Recent project experience]

Loadout Facility:

- Lump sum - \$500,000 [Recent project experience]

Rail Line Spur/Railcar Storage:

- Installed cost - \$1,000,000 per mile [Recent project experience]

Temporary Bunkers for Loadout Facility:

- Two bunkers at \$10,000 each [Recent project experience]

Hazardous Material Storage Area:

- Lump sum [Cost estimating software, Recent project experience]

Dewatered Material Testing for Disposal:

- Analytical cost [Vendor communications]

3.3 Local Decontamination and Beneficial Use (DMM Scenario C)

Upland Sediment Processing Facility Site Investigation - Geotechnical:

- Cost for core sampling and processing - \$1,800 per core [Recent project experience]
- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Upland Sediment Processing Facility Site Investigation – Chemical:

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Topographic Survey – Uplands Sediment Processing Facility Site:

- Daily rate for survey crew - \$4,000 [Recent project experience]

Mobilization and Demobilization:

- Ten percent of DMM construction phase capital costs (not including DMM Pre-Construction Activities costs) [Standard multiplier]

Mechanical and Electrical:

- Ten percent of DMM construction phase capital costs (not including DMM Pre-Construction Activities and Mobilization costs) [Standard multiplier]

Layout and Documentation Survey:

- Daily rate for survey crew - \$4,000 [Contractor communications]

Fencing:

- Material purchase and installation - \$60 per linear foot [Cost estimating software]

Exterior Lighting:

- Material purchase and installation - \$50,000 per acre [Cost estimating software]

Security:

- Lump sum cost of \$100,000 [Recent project experience]

Buildings

- Processing Building
 - Cost - \$100 per square foot not including amenities [Cost estimating software, Recent project experience]
- Guard shack - 150 square feet @ \$100 per square foot [Recent project experience]
- Truck wash - Lump sum \$100,000 [Cost estimating software, Recent project experience]

Utilities

- Electrical connection - \$500,000 [Recent project experience, Vendor communications]

Paving:

- Installed cost of filter fabric - \$2 per square yard [Cost estimating software]
- Installed cost of subgrade material - \$40 per cubic yard [Cost estimating software]
- Installed cost of plant mix asphalt paving - \$20 per square yard [Cost estimating software]

Pier/Dock Structure

- Material cost and installation - \$160 per square foot [Recent project experience]

Storage Area – Concrete Slab and Push Walls:

- Installed costs for concrete slabs - \$600 per cubic yard [Cost estimating software, Recent project experience]

Storage Area – Subgrade Material:

- Installed cost for subgrade material under slab - \$40 per cubic yard [Recent project experience]

Storage Area – Filter Fabric:

- Installed cost for filter fabric under slab - \$2 per square yard [Cost estimating software, Recent project experience]

Storage Area –Vapor Emissions Control:

- Installed cost per unit - \$5,000 [Recent project experience]

Piping

- Installed/delivered cost - \$25 per linear foot for exterior piping and \$15 per linear foot for interior piping [Cost estimating software, Recent project experience]

Upfront Storage and Recycle Water Tanks

- Storage capacity provided for each tank- 12 hours [Recent project experience]

Loadout Facility:

- Lump sum - \$500,000 [Recent project experience]

Transfer Vehicle Storage:

- Installed cost per square yard - \$30 [Cost estimating software]

Temporary Bunkers for Loadout Facility:

- Two bunkers at \$10,000 each [Recent project experience]

Hazardous Material Processing and Storage Area:

- Lump sum [Cost estimating software, Recent project experience]

Dewatered Material Testing for Disposal:

- Analytical cost [Vendor communications]

4 DREDGED MATERIALS MANAGEMENT O&M COSTS

4.1 K. DMM Site O&M

Operational Testing

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Wastewater Testing

- Analytical and validation cost per sample:
 - TAL/TCL plus cyanide - \$625 [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Air Monitoring:

- Fugitive dust, VOCs and odors - \$5000 per month [Vendor communications]

Wastewater Testing

- Analytical and validation cost per sample:
 - TAL/TCL plus cyanide - \$625 [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Air Monitoring:

- Fugitive dust, VOCs and odors - \$5000 per month [Vendor communications]

5 LONG TERM O&M COSTS

5.1 Annual O&M

Community Outreach

- Lump sum of \$95,000 per year [Recent project experience]

Water Column Sampling and Analysis:

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

Sediment Sampling and Analysis

- Analytical and validation cost per sample [Vendor communications]
- Shipping cost of \$100 per cooler; four samples per cooler [Recent project experience]

5.2 Periodic O&M

Community Outreach

- Lump sum of \$95,000 per year [Recent project experience]